Claims

1. A method for making pods (1) of filter material containing products for infusion, characterised in that it comprises at the least the following steps:

- making at least one compressed disk (2) of product, equivalent to a dose of the product, at respective dosing and forming stations (3, 4);
- forming the pod (1) with the compressed disk (2) positioned inside the filter paper.

2. The method according to claim 1, characterised in that the step of making the disk (2) comprises a step of tamping to compress the product.

3. The method according to claim 1, where the pods (1) comprise two pieces (5, 6) of filter material placed over each other and sealed and containing a dose of the product for infusion, the method being characterised in that it further comprises at least the following steps:

- feeding a first portion (5) of filter material;
- making the compressed disk (2) of product, equivalent to a dose of the product, at respective dosing and forming stations (3, 4);
- depositing the compressed disk (2) on the first portion (5) of filter material;
- associating a second portion (6) of filter material with the first portion (5) of filter material to encapsulate the compressed disk (2) to form the pod (1).

4. The method according to claim 3, characterised in that the first and second portions of filter material are obtained from webs (5, 6) of the same filter material.

5. The method according to claim 3, characterised in that the first portion of filter material is obtained from a web (5) fed in a straight line.

6. The method according to claim 3, characterised in that between the step of placing the compressed disk (2) and the associating step there is a further step of making in the second portion (6) of filter material a counter-impression (7) shaped to match the disk (2) and designed to be placed over the disk (2).

7. The method according to claim 1 or 3, characterised in that the step of making the disk (2) comprises the sub-steps of:

- depositing a dosed quantity of the product in a respective impression (8) while moving along a first defined path (P1) of the forming station (4); and

- compressing the dose of product inside the impression (8) while moving along a second defined path (P2) following the first path (P1).

8. The method according to claim 7, characterised in that between the dosing and compressing sub-steps there is a step of levelling off the dosed product inside the impression (8).

9. The method according to claim 7, characterised in that the first and second paths (P1, P2) are arc-shaped and cover respective angles (α) and (β) following each other.

10. The method according to claim 3, characterised in that the depositing step is accomplished by allowing the compressed disk (2) to drop out of a respective impression (8) by gravity onto the first portion (5) of filter material.

11. The method according to claim 3, characterised in that the depositing step is accomplished by allowing the compressed disk (2) of product to drop out of a respective impression (8) by gravity onto the first portion (5) of filter material where it is held in place by suction.

12. The method according to claim 3, characterised in that the step of associating the first and second portions (5, 6) of filter material is performed by heat sealing.

13. The method according to claim 3, characterised in that the associating step is followed by a step of cutting the first and second portions (5, 6) of filter material to form the pod (1).

14. An apparatus for making pods (1) containing products for infusion, the pods (1) being of the type comprising two pieces of filter material placed over each other and sealed and containing a dose of the product for infusion; the apparatus (9) comprising at least two independent stations (10, 11) for feeding respective portions (5, 6) of filter material and being characterised in that it comprises at least the following:

- a station (12) for feeding the first portion (5) of filter material in a feed direction (A) and at least to
- a station (3) for dosing individual doses of the product into at least one forming impression (8) located on means (4) for forming a respective disk (2) of the infusion product and releasing the disk (2) onto the first portion (5) of filter material;
- a station (13) for associating the first portion (5) of filter material with the second portion (6) of filter material to form the pod (1).

15. The apparatus according to claim 14, characterised in that, downstream of the dosing and forming station (3) in the feed direction (A), it comprises a station (14) for making a counter-impression (7) in the second portion (6) of filter material and placing the counter-impression (7) over the product disk (2).

16. The apparatus according to claim 14, characterised in that the two stations (10, 11) for feeding the filter material unwind respective webs (5, 6) of the filter material.

17. The apparatus according to claim 14, characterised in that, downstream of the associating station (13), it comprises a station (15) for cutting off the disk (2) encapsulated in the two portions (5, 6) of filter material to form a pod (1).

18. The apparatus according to claim 17, characterised in that it comprises a station (16) for separating the pod (1) from the waste material (17), which is collected in a recovery station (18).

19. The apparatus according to claim 14, characterised in that the feed station (12) comprises a first endless belt (19), trained around a pair of sheaves (20, 21) and having a perforated or porous surface; means (22) being provided for creating a vacuum at least at the working section of the first belt (19) which feeds the first portion (5) of filter material and on which the product disk (2) is deposited.

20. The apparatus according to claim 14, characterised in that the dosing station (3) comprises a fixed hopper (23) mounted to face a first revolving drum (24), forming part of the forming means (4); the hopper (23) having an arc-shaped discharge portion

to peripherally follow a passing surface of the first drum (24) in such manner that the product is dosed in a predetermined area.

21. The apparatus according to claim 14, characterised in that the means (4) for forming the disk (2) comprise a first revolving drum (24) equipped with a plurality of pistons (25) arranged radially on the surface of the first drum (24) and having a hollow head (26) designed to receive a dose of the product fed by the dosing station (3); radial drive means (27) being provided between each piston (25) and the first drum (24) to act upon the pistons (25) in such manner as to impart a plurality of synchronised movements to the pistons (25) according to their angular positions on a circular path (P) and so as to receive the product, compress the product to form the disk (2), detach and deposit the disk (2) onto the first portion (5) of filter material.

22. The apparatus according to claim 21, characterised in that the radial drive means comprise cam means (27) consisting of at least one guide cam profile (28) stably associated with the interior of the drum (24) and engaged by a cam follower roller (29) for each piston (25); each cam follower roller (29) being attached to the end of a respective connecting rod (30) whose other end is associated with a control pin (31) rotatably connected to the inside end of the cylinder (25c) of the piston (25) so as to drive the piston (25) radially in both directions according to the angular position of the piston (25) on the circular path (P).

23. The apparatus according to claims 21 and 22, characterised in that the cam means (27) cause each single piston (25) to be positioned according to movements referenced to a relative position or angular section of the circular path (P) and corresponding to:

- a first arc-shaped path section (P4) where the piston (25) is radially retracted towards the first drum (24) in such a way that the piston (25) moves into a product dosing configuration when it reaches a point (P4A) corresponding to its bottom dead centre;
- a second arc-shaped path section (P1) for dosing where the piston (25) is initially at the bottom dead centre (P4A), in such manner as to collect as much product as possible in the head (26),

and moves in a radial direction towards the outside of the first drum (24) until it reaches the endpoint (P3) of the dosing station (3) where there is a wall (23a) for levelling off the product accommodated in the impression (8);

- a third arc-shaped path section (P2) for tamping the disc (2), where the piston (25) moves radially towards the outside of the first drum (24) and against a stop wall (35) corresponding to its top dead centre (P2M) where it remains until it starts on
- a fourth arc-shaped path section (P5) where the piston (25) moves back up in order to facilitate detachment of the disc (2) from the impression (8) just before reaching the point (P0) where the disc (2) is released.

24. The apparatus according to claim 22, characterised in that the cam profile (28) is divided into two arc-shaped sections (28a, 28b), a fixed lower section (28a) and an adjustable upper section (28b) corresponding to a part of the path (P) of the pistons (25) comprising at least one area where the product is filled into the pistons (25).

25. The apparatus according to claim 21, characterised in that the first drum (24) is equipped with rotational drive means (32) acting on each piston (25) and designed to continuously revolve each piston (25) about its axis; the rotational drive means (32) comprising a fixed ring gear (33) mounted inside the first drum (24) and meshed with corresponding gear wheels (34) keyed to the respective cylinder (25c) of each piston (25) so that the pistons (25) revolve continuously as they move round the circular path (P), thus tamping the disk (2) and preventing it from sticking inside the head (26) of the piston (25) while enabling the disk (2) to be detached completely when it is deposited on the first portion (5) of filter material.

26. The apparatus according to claim 21, characterised in that there are arc-shaped walls (35, 36) round the outer surface of the first drum (24) designed to permit the pistons (25) to be pushed against the impressions (8) in a part of the circular path (P) and in such a way as to co-operate with the pistons (25) at least when the disk (2) is formed and compressed.

27. The apparatus according to claim 21, characterised in that the first portion (5) of filter material is fed close to the first drum (24) along an inclined path that partially and peripherally follows the surface of the first drum (24) in an area close to where the disk (2) is deposited on the first portion (5) of filter material.

28. The apparatus according to claim 21, characterised in that the station (14) for making the counter-impression (7) on the second portion (6) of filter material comprises a second drum (37) presenting a plurality of recesses (38) distributed uniformly on its outer surface to which the second portion (6) of filter material is held by suction; one section of a second endless forming belt (39) being located and operative on a portion of the surface of the second drum (37) and being equipped with protrusions (40) positioned and shaped to match the recesses (38) as the latter move round, thus making a counter-impression (7) on the second portion (6) placed between the second drum (37) and the second belt (39) by pushing the second portion (6) into the recesses (38).

29. The apparatus according to claims 14 and 28, characterised in that the associating station (13) comprises a circular sealing element (41) positioned under the second drum (37) and designed to seal the first portion (5) of filter material, with the disk (2) on it, to the second portion (6) of filter material placed over the disk (2) to form a succession of sealed pods (1).

30. The apparatus according to claims 17, characterised in that the cutoff station (15) comprises a circular knife (15a) and a counter-knife (15b) positioned on opposite sides of a feed line (A) of the first and second portions (5, 6) of filter material sealed to each other and forming a succession of pods (1).